

Appendix F

CHART Assessment for the Columbia River Chum Salmon ESU

CHART Participants

The CHART for this ESU consisted of the following NOAA Fisheries biologists: Ben Meyer (CHART Leader), Michelle Day, Patty Dornbusch, Dan Guy, Lynne Krasnow, Lance Kruzic, Nancy Munn, Mindy Simmons, Cathy Tortorici, and Rich Turner. This CHART assessment also benefitted from review and comments from the Oregon Department of Fish and Wildlife and the Washington Department of Fish and Wildlife.

ESU Description

The Columbia River chum salmon ESU was listed as a threatened species in 1999 (64 FR 14508; March 25, 1999). The ESU includes all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon (64 FR 14508; March 25, 1999). The agency recently conducted a review to update the ESU's status, taking into account new information and considering the net contribution of artificial propagation efforts in the ESU. We recently published the results of this review and concluded that Columbia River chum salmon (including three hatchery programs) should remain listed as threatened (70 FR 37160; June 28, 2005).

The following brief description is based largely on life history information and excerpts from the report of the Lower Columbia Fish Recovery Board (LCFRB 2003) and the Willamette/Lower Columbia River Technical Recovery Team's (TRT) recent review of historical population structure for this ESU (Myers et al. 2003).

Intensive monitoring of chum spawning escapement is conducted in three Washington tributaries in the lower Columbia basin—Grays River, Hardy Creek, and Hamilton Creek—and in the mainstem Columbia River near Ives Island. The latter three populations are located immediately downstream of Bonneville Dam. Chum salmon populations exist in other river systems of the lower Columbia, but are not consistently monitored and are assumed to be extremely low in abundance.

Chum salmon returning to the Columbia River are considered a fall run. Adult fall run chum salmon return to the Columbia River from mid-October through November, but apparently do not reach the Grays River until late October-early December. Spawning occurs in the Grays River from early November to late December. Fish returning to Hamilton and Hardy Creeks begin to appear in the tributaries in early November and their spawn timing is more protracted (mid-November-mid-January).

Chum seldom show persistence in surmounting river blockages and falls, which may be why they usually spawn in lower river reaches. Chum salmon spawn typically dig their redds in the mainstem or in side channels of rivers from just above tidal influence to nearly 60 miles (100 km) from the sea. They spawn in shallower, slower-running streams and side channels more frequently than do other salmonids. In some locations, subgravel flow (upwelled groundwater from seeps and springs) may be important in the choice of redd sites by chum salmon. Many Columbia River chum have been found to select spawning sites in areas of upwelling groundwater. New spawning grounds for chum were recently discovered along the northern Columbia River shoreline near the I-205 Glen Jackson Bridge where groundwater upwelling occurs. A significant number of chum returning to Hamilton Creek spawn in a spring-fed channel, and portions of the Grays River and Hardy Creek populations spawn in the area of springs. Hundreds of chum salmon once returned to spawn within spring-fed areas along Duncan Creek; efforts have been completed to restore passage to these productive areas and protect the springs that feed them.

Chum do not have a clearly defined smolt stage, but are nonetheless capable of adapting to seawater soon after emerging from gravel. Downstream migration may take only a few hours or days in rivers where spawning sites are close to the mouth of the river. Historical information concerning the timing of chum salmon emigration in the lower Columbia River is limited. Recent seining projects conducted in the Grays River and at Ives Island indicate outmigration occurs from March through May and peaks from mid-April to early May.

Chum salmon juveniles, like other anadromous salmonids, use estuaries to feed before beginning long-distance oceanic migrations. However, chum and ocean-type Chinook salmon usually have longer residence times in estuaries than do other anadromous salmonids. The period of estuarine residence appears to be the most critical phase in the life history of chum salmon and may play a major role in determining the size of the subsequent adult run back to fresh water. Chum salmon spend more of their life history in marine waters than other Pacific salmonids. Juveniles feed primarily on plankton and epibenthic organisms, while subadults feed on similar items as well as larger prey (including fishes and squid). Most adults mature and spawn as 3-year old fish.

Recovery Planning Status

The Willamette/Lower Columbia River TRT identified 16 historical demographically independent populations of chum in the Columbia River: the Youngs Bay, Grays River, Big Creek, Elochoman River, Clatskanie River, Mill Creek, Scappoose Creek, Cowlitz

River fall-run and summer-run, Kalama fall-run, Salmon Creek fall-run, Lewis River fall-run, Clackamas River fall-run, Washougal River fall-run, Sandy River fall-run, Lower Gorge tributaries fall-run, and the Upper Gorge tributaries fall-run populations (Myers et al. 2003). All but two of these historical populations appear to have been extirpated, or nearly so. Although the historical record for Columbia River chum salmon is limited, it is clear that chum salmon were present in most tributaries to the lower Columbia River and to some extent were present in the mainstem (Myers et al. 2003). The Columbia River chum salmon ESU inhabits three ecological zones (Coast Range, Cascade, and Columbia Gorge) and contains a single life-history type (fall run). Recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of ecological zones (Ruckelshaus et al. 2002, McElhany et al. 2003). A draft recovery plan for the Washington management unit of this ESU was completed by the Lower Columbia Fish Recovery Board (LCFRB 2004) and released by NMFS for public comment in April 2005. NMFS expects to use this plan as an interim regional recovery plan until a plan for the whole ESU is completed. A preliminary draft plan for Oregon areas of the ESU is expected by the end of 2005. The CHART considered LCFRB plan and the TRT products in rating each habitat area, but did not have the benefit of regional recovery plans throughout the range of this ESU. We anticipate that, as recovery planning proceeds, we will have better information and may revise our recommendations regarding critical habitat designation.

CHART Area Assessments

The CHART assessment for this ESU addressed six subbasins containing 19 occupied watersheds, as well as the lower Columbia River rearing/migration corridor. The Willamette/Lower Columbia Technical Recovery Team (TRT) has placed groups of populations in this recovery planning domain into “strata” intended to assist in evaluating ESU-wide recovery scenarios (McElhany et al. 2002). The strata are based on major life history characteristics (e.g., species run types) and ecological zones. The Columbia River chum salmon ESU inhabits three ecological zones (Coast Range, Cascade, and Columbia Gorge) and contains a single life history type (fall run), resulting in a total of three strata for this ESU (McElhany et al. 2002). As noted above, recovery planning will likely emphasize the need for a geographical distribution of viable populations across the range of such strata/regions in an ESU (Ruckelshaus et al. 2002, McElhany et al. 2003). Therefore, as part of its assessment the CHART considered the conservation value of each HUC5 in the context of the populations within these strata. Information is presented below by USGS subbasin because they present a convenient and systematic way to

organize the CHART's watershed assessments for this ESU and their names are generally more recognizable because they typically identify major river systems.

Middle Columbia/Hood Subbasin (HUC4# 17070105)

The Middle Columbia/Hood subbasin is located in the eastern portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Hood River, Multnomah, and Wasco counties in Oregon, and Klickitat and Skamania counties in Washington. The subbasin contains 13 watersheds, three of which are occupied by this ESU (almost exclusively as rearing/migration habitat). Occupied watersheds encompass approximately 669 mi² and 282 miles of streams. This subbasin may be the upstream extent of the species' distribution in the entire Columbia River basin (Myers et al. 2003). Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 27 miles of occupied riverine habitat in the watersheds, including a 22-mile segment of the Columbia River (WDFW 2003). The CHART amended the WDFW distribution data with recent information indicating that chum salmon may occupy the lower reaches of the White Salmon River (Ehlke 2003). Myers et al. (2003) identified a single ecological zone (Columbia Gorge) containing two historical demographically independent populations in this subbasin (Upper Gorge Tributaries and Lower Gorge Tributaries). The Lower Gorge Tributaries population has been classified by the TRT as a "core" population (i.e., historically abundant and "may offer the most likely path to recovery") as well as a genetic legacy population (i.e., one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F1 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. The CHART noted that two HUC5s (Middle Columbia/Eagle Creek and Middle Columbia/Grays Creek) contain a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed

Lower Columbia/Sandy Subbasin (HUC4# 17080001)

The Lower Columbia/Sandy subbasin is located in the western portion of the Columbia River gorge of Oregon and Washington. Occupied watersheds in this subbasin are contained in Multnomah County, Oregon, and Clark and Skamania counties in Washington. The subbasin contains nine watersheds, three of which are occupied by this ESU. Occupied watersheds encompass approximately 571 mi² and 277 miles of streams. This subbasin contains some of the principal spawning habitat for the entire ESU (e.g., in Hardy and Hamilton creeks and adjacent areas of the mainstem Columbia River). Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 84 miles of occupied riverine habitat in the watersheds, including a 26-mile segment of the Columbia River (ODFW 2003a,b; WDFW 2003). Myers et al. (2003) identified two ecological zones (Cascade and Columbia Gorge) containing three historical demographically independent populations in this subbasin: Lower Gorge Tributaries, Washougal River, and Salmon Creek. The Lower Gorge Tributaries population has been classified by the TRT as a “core” population (i.e., historically abundant and “may offer the most likely path to recovery”) as well as a genetic legacy population (i.e., one of “the most intact representatives of the genetic character of the ESU”) (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F2 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin are of high conservation value to the ESU. The CHART also noted that the Columbia Gorge Tributaries HUC5, in addition to the key mainstem spawning areas, also contains a high value rearing and migration corridor in the Columbia River connecting high value upstream watersheds with downstream reaches and the ocean. Table F2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lewis Subbasin (HUC4# 17080002)

The Lewis subbasin is located in southwest Washington and contained in Clark, Cowlitz, and Skamania counties (a very small and unoccupied portion in the uppermost watershed is contained in Yakima County). The subbasin contains six watersheds, two of which are

currently occupied by this ESU and the remaining four are now blocked by Merwin Dam and others upstream. Occupied watersheds encompass approximately 456 mi² and 255 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 71 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified a single ecological zone (Cascade) containing one historical demographically independent population in this subbasin (Lewis River). The TRT has classified this as a “core” population (historically abundant and “may offer the most likely path to recovery”) and the East Fork Lewis River summer-run population as a genetic legacy population (one of “the most intact representatives of the genetic character of the ESU”) (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F3 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that both of the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table F2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia/Clatskanie Subbasin (HUC4# 17080003)

The Lower Columbia/Clatskanie subbasin is located in southwest Washington and northwest Oregon. This subbasin contains six watersheds, three of which are occupied by this ESU and encompass approximately 543 square miles. Occupied watersheds in this subbasin are contained in Cowlitz, Lewis, Skamania, and Wahkiakum counties in Washington. Occupied watersheds encompasses approximately 543 mi² and 267 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 51 miles of occupied riverine habitat in these watersheds (WDFW 2003). Myers et al. (2003) identified two ecological zones (Coast Range and Cascade) containing five historical demographically independent populations in this subbasin: Kalama River, Mill Creek, Elochoman River, Clatskanie River, and Scappoose River. The Elochoman River population has been classified by the TRT as a “core” population, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watershed. Map F4 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that all of the occupied HUC5 watersheds in this subbasin are of high conservation value to the ESU. Table F2 summarizes the CHART's PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Cowlitz Subbasin (HUC4# 17080005)

The Lower Cowlitz subbasin is located in southwest Washington and contained in Cowlitz, Lewis, and Skamania counties. The subbasin contains eight watersheds, six of which are occupied by this ESU. Occupied watersheds encompass approximately 1,102 mi² and 492 miles of streams. Fish distribution and habitat use data from the Washington Department of Fish and Wildlife (WDFW) identify approximately 243 miles of occupied riverine habitat in the watersheds (WDFW 2003). Myers et al. (2003) identified one ecological zone (Cascade) containing a single historical demographically independent population (Cowlitz River) of chum salmon in this subbasin. This population has been classified by the TRT as a "core" population (i.e., historically abundant and "may offer the most likely path to recovery") and a genetic legacy population (i.e., one of "the most intact representatives of the genetic character of the ESU") (McElhany et al. 2003).

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F5 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART determined that the occupied HUC5 watersheds in this subbasin were of high or medium conservation value to the ESU. Of the six HUC5s reviewed, three were rated as having high and three were rated as having medium conservation value to the ESU. The CHART also noted that two HUC5s (East Willapa and Cowlitz River) contained high value rearing and migration corridors connecting high value upstream watersheds with downstream reaches and the ocean. Table F2 summarizes the CHART's PCE/watershed scores and conservation

value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia Subbasin (HUC4# 17080006)

The Lower Columbia subbasin is located at the mouth of the Columbia River in southwest Washington and Northwest Oregon. Occupied watersheds in this subbasin are contained in Clatsop County, Oregon, and Lewis, Pacific, and Wahkiakum counties in Washington. The subbasin contains three watersheds, two of which (Grays Bay and Big Creek) are occupied by this ESU. Occupied watersheds encompass approximately 304 mi² and 138 miles of streams. Fish distribution and habitat use data from the Oregon Department of Fish and Wildlife (ODFW) and Washington Department of Fish and Wildlife (WDFW) identify approximately 62 miles of occupied riverine habitat in the watersheds (ODFW 2003a,b; WDFW 2003). The CHART received recent data from ODFW (R. Turner, NOAA Fisheries, personal communication) indicating that the Big Creek watershed is occupied by this ESU, even though ODFW data identifies these reaches as “historically occupied.” Myers et al. (2003) identified a single ecological zone (Coast Range) containing three demographically independent populations in this subbasin (Grays and Chinook Rivers, Youngs Bay, and Big Creek). The Youngs Bay, Grays and Chinook Rivers, and Big Creek populations have been classified by the TRT as “core” populations, i.e., historically abundant and “may offer the most likely path to recovery” (McElhany et al. 2003). In addition, the TRT classified the Grays and Chinook Rivers population as a genetic legacy population, i.e., one of “the most intact representatives of the genetic character of the ESU.”

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that all of the occupied areas in this subbasin contain one or more PCEs for this ESU. Table F1 summarizes the total number of occupied reaches identified for each HUC5 watershed as containing spawning, rearing, or migration PCEs, as well as management activities that may affect the PCEs in the watersheds. Map F6 depicts the specific areas in this subbasin occupied by the ESU and under consideration for critical habitat designation. The CHART also determined that the occupied HUC5 watersheds in this subbasin were of high conservation value to the ESU. Table F2 summarizes the CHART’s PCE/watershed scores and conservation value ratings, and Figure F1 shows the overall distribution of ratings by HUC5 watershed.

Lower Columbia River Corridor

The lower Columbia River rearing and migration corridor consists of that segment from the mouth of the Columbia River at the Pacific Ocean upstream to an imaginary line connecting the confluences of the Sandy River (Oregon) and Washougal River (Washington). This corridor overlaps with the following counties: Clatsop, Columbia, and Multnomah counties in Oregon, and Clark, Cowlitz, Pacific, and Wahkiakum counties in Washington. Fish distribution and habitat use data from WDFW identify approximately 118 miles of occupied riverine and estuarine habitat in this corridor (WDFW 2003). Table B1 summarizes the total number of occupied reaches in this corridor containing rearing or migration PCEs, as well as management activities that may affect the PCEs.

After reviewing the best available scientific data for all of the areas within the freshwater and estuarine range of this ESU, the CHART concluded that the lower Columbia River corridor was of high conservation value to the ESU. Other upstream reaches of the Columbia River corridor (within the Middle Columbia/Hood and Lower Columbia/Sandy subbasins above) are also high value for rearing/migration. The CHART noted that the lower Columbia River corridor connects every watershed and population in this ESU with the ocean and is used by rearing/migrating juveniles and migrating adults. The Columbia River estuary is a particularly important area for this ESU as both juveniles and adults make the critical physiological transition between life in freshwater and marine habitats (ISAB 2000, Marriott et al. 2002).

Marine Areas

NOAA Fisheries' analysis focused on freshwater and estuarine habitats upstream of the mouth of the Columbia River. While marine areas are occupied by this ESU, within this vast area the agency has not identified "specific areas within the geographical area occupied by the species . . . on which are found those physical or biological features . . . essential to the conservation of the species."

Changes to the CHART's Initial Assessments

The CHART reviewed the public and peer reviewer comments received on the Team's initial findings for this ESU as well as new information relevant to evaluating habitat areas for this ESU. As a result, the CHART did not change conservation value ratings for any watershed within the geographical area occupied by this ESU, and there were no changes to the delineation of occupied habitat areas. The proposed critical habitat designation (69 FR 74572, December 14, 2004) summarizes the comments and responses

pertaining to the CHART's initial determinations for this ESU, and Tables F1 and F2 reflect the final CHART assessments.

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Table F1. Summary of Occupied Areas, PCEs, and Management Activities Affecting PCEs for the Columbia River Chum Salmon ESU

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Middle Columbia/ Hood	White Salmon River	1707010509	0	0	3.4	4.5 ^x	A, C, D, F, R, U
	Middle Columbia/ Hood	Wind River	1707010511	0	0	0	2.8 ^y	
	Middle Columbia/ Hood	Middle Columbia/Grays Creek	1707010512	0	0	13.8		R, U
	Middle Columbia/ Hood	Middle Columbia/Eagle Creek	1707010513	0	0	9.3		D, R, U
	Lower Columbia/ Sandy	Washougal River	1708000106	0	0	14.9		C, F, R, S, U, W
	Lower Columbia/ Sandy	Columbia Gorge Tributaries	1708000107	8.5	0.1	41.3		C, D, F, R, U, W
	Lower Columbia/ Sandy	Salmon Creek	1708000109	0.2	0	19.4		A, C, F, R, U, W
	Lewis	East Fork Lewis River	1708000205	0	0	44.1		A, C, F, R, S, U, W
	Lewis	Lower Lewis River	1708000206	0	0	27.1		A, C, D, F, R, U, W
	Lower Columbia/ Clatskanie	Kalama River	1708000301	0	0	9.1		C, F, R, U, W
	Lower Columbia/ Clatskanie	Germany/Abernathy	1708000304	0	0	6.8		A, C, F, R, U, W
	Lower Columbia/ Clatskanie	Skamokawa/ Elochoman	1708000305	3.4	8	24		A, C, F, R, W
	Cowlitz	Jackson Prairie	1708000503	0	0	78.7		A, C, D, F, R
	Cowlitz	North Fork Toutle River	1708000504	0	0	0.9		F, R
	Cowlitz	Green River	1708000505	0	0	2.4		F, R
	Cowlitz	South Fork Toutle River	1708000506	0	0	9.4		F, R
	Cowlitz	East Willapa	1708000507	0	0	74.9		A, C, F, R, U, W
	Cowlitz	Coweeman	1708000508	0	0	76.8		A, C, F, R, U, W
	Lower Columbia	Big Creek	1708000602	0	0	6		A, C, F, I, R, W
	Lower Columbia	Grays Bay	1708000603	6.8	17.8	31.4		C, F, R, W

^x Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.

^y Unoccupied HUC5, but population expansion into this HUC5 possibly essential for conservation.

Map Code	Subbasin	Watershed	Area/ Watershed (HUC5) Code	Primary Constituent Elements (PCEs)			Unoccupied but may be essential (mi)**	Management Activities***
				Spawning/ Rearing PCEs (mi)	Rearing/ Migration PCEs (mi)	Migration/ Presence PCEs (mi)*		
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA	0	29.1	147.2 ^z		C, D, I, R, T, U, W

* Some streams classified as “Migration/Presence PCEs” may also include rearing or spawning PCEs, but the GIS data are still undergoing review to confirm additional habitat use types.

** These watersheds contain unoccupied habitat that historically supported spawning and rearing PCEs. The CHART determined that these habitat areas/watersheds may be essential for conservation of the ESU. Since these watersheds are unoccupied, the CHART did not identify management activities.

*** This list is not exhaustive. It is intended to highlight key management activities affecting PCEs in each watershed. Activities identified are based on the general categories described by Spence et al. (1996) and summarized previously in the “Special Management Considerations or Protection” section of this report. Coding is as follows: F= forestry, G = grazing, A = agriculture, C = channel modifications/diking, R = road building/maintenance, U = urbanization, S = sand and gravel mining, M = mineral mining, D = dams, I = irrigation impoundments and withdrawals, T = river, estuary, and ocean traffic, W = wetland loss/removal, B = beaver removal, X = exotic/invasive species introductions, H = forage fish/species harvest. Primary sources for this information were the CHART and reports by LCFRB (2003), Subbasin Summary Reports of the NWPPC, and land use/land cover GIS layers from the U.S. Geological Survey.

^z The Lower Columbia River from the ocean upstream approximately 46.5 miles is considered to contain estuarine PCEs, in addition to migration and rearing (ISAB 2000).

Table F2. Summary of Initial CHART Scores and Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Columbia River Chum Salmon ESU

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Middle Columbia/Hood	White Salmon River	1707010509	2	1	2	1	2	8	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; recent evidence of spawning in the Big White Salmon River may be the only extant production within the range of the TRT's historical Upper Gorge Tributaries population; Watershed contains unoccupied habitat above Condit Dam that may be essential for conservation.	High
	Middle Columbia/Hood	Wind River	1707010511						*	<u>Unoccupied HUC5</u> , but population expansion into this HUC5 possibly essential for conservation; High HUC5 score	Possibly High

² PCE/watershed scores were derived using the CHART scoring process described in the introduction to this report. The CHART employed an earlier 5-factor version of the scoring matrix for three ESUs (Columbia River chum salmon and Upper Willamette River chinook salmon and steelhead) therefore the maximum possible score for these ESUs was 15 points.

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Middle Columbia/Hood	Middle Columbia/Grays Creek	1707010512	1	1	1	2	3	8	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; no tributary or spawning habitat identified in this HUC5 but CHART concluded that Columbia River rearing/migration PCEs in this HUC5 downstream from Big White Salmon River are of high conservation value to the ESU	High
	Middle Columbia/Hood	Middle Columbia/Eagle Creek	1707010513	1	1	1	2	3	8	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; no tributary or spawning habitat identified but CHART concluded that Columbia River rearing/migration PCEs in this HUC5 are of high conservation value to the ESU	High
	Lower Columbia/Sandy	Washougal River	1708000106	2	1	1	2	3	9	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; this HUC5 is near mainstem Columbia River spawning area and may contain important rearing PCEs; LaCamas Creek noted as having seeps or springs that may be important for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lower Columbia/Sandy	Columbia Gorge Tributaries	1708000107	3	2	3	3	3	14	High HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; this HUC5 within range of TRT historical Lower Gorge Tributaries population and contains essential tributary spawning sites as well as mainstem Columbia River spawning sites in the vicinity of Hardy and Hamilton creeks and downstream near Camas, WA; HUC5 also contains important springs/seeps and is a high value Columbia River rearing/migration corridor for the ESU	High
	Lower Columbia/Sandy	Salmon Creek	1708000109	2	2	3	1	3	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; this HUC5 is believed to contain some spawning/rearing habitat; HUC5 includes entire spawning range of a TRT historical population	High
	Lewis	East Fork Lewis River	1708000205	3	1	1	2	2	9	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; HUC5 is one of two supporting a TRT historical core population; East Fork Lewis River noted as having seeps or springs that may be important for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lewis	Lower Lewis River	1708000206	3	3	1	2	2	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; HUC5 is one of two supporting a TRT historical core population	High
	Lower Columbia/ Clatskanie	Kalama River	1708000301	3	2	1	2	3	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; HUC5 includes entire spawning range of a TRT historical population	High
	Lower Columbia/ Clatskanie	Germany/ Abernathy	1708000304	2	2	2	1	3	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population; Mill, Germany, and Abernathy creeks noted as having seeps or springs that may be important for this ESU	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lower Columbia/ Clatskanie	Skamokawa/ Elochoman	1708000305	2	1	2	2	3	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population; Skamokawa Creek noted as having seeps or springs that may be important for this ESU	High
	Cowlitz	Jackson Prairie	1708000503	3	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of at least three HUC5s supporting a TRT historical core population and PCEs are relatively extensive here	High
	Cowlitz	North Fork Toutle River	1708000504	0	3	1	0	2	6	Low-Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs (and this HUC5 has one of the lowest)	Medium
	Cowlitz	Green River	1708000505	3	1	1	0	2	7	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs (and this HUC5 has one of the lowest)	Medium

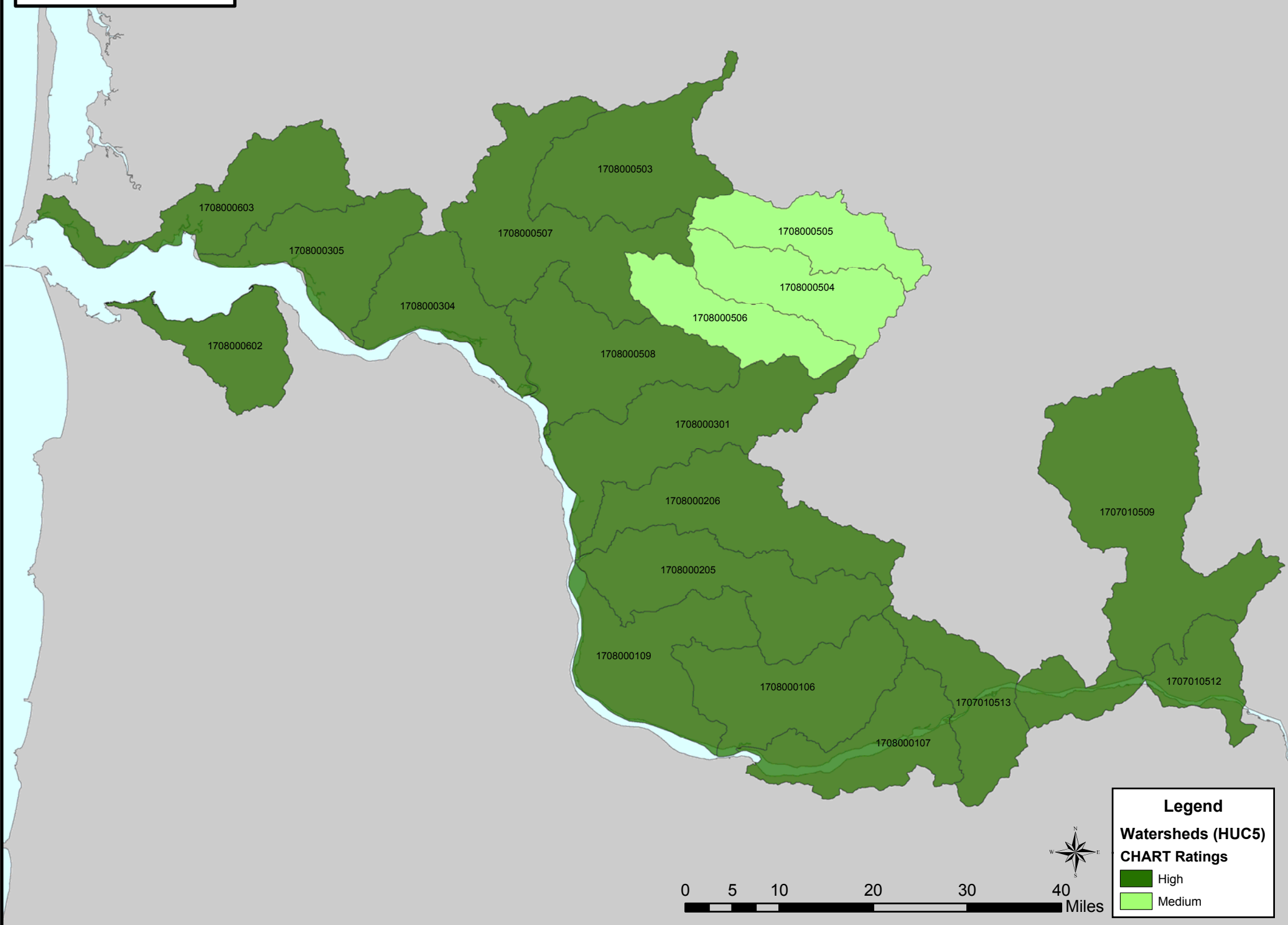
Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Cowlitz	South Fork Toutle River	1708000506	2	1	1	1	2	7	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs (and this HUC5 has one of the lowest)	Medium
	Cowlitz	East Willapa	1708000507	3	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of at least three HUC5s supporting a TRT historical core population and PCEs are relatively extensive here; HUC5 also contains important connectivity corridor for a high-value upstream HUC5	High
	Cowlitz	Coweeman	1708000508	3	2	1	2	2	10	Moderate HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of at least three HUC5s supporting a TRT historical core population and PCEs are relatively extensive here; HUC5 also contains important connectivity corridor for a high-value upstream HUC5	High

Map Code	Subbasin	Area/ Watershed	Area/ Watershed (HUC5) Code	Scoring System (factors)					Total HUC5 Score (0-15) ²	Comments/ Other Considerations	CHART Rating of HUC5 Conservation Value
				1	2	3	4	5			
	Lower Columbia	Big Creek	1708000602	2	2	2	2	3	11	Moderate-high HUC5 score; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population	High
	Lower Columbia	Grays Bay	1708000603	3	2	3	3	3	14	Highest HUC5 score for entire range of ESU; CHART concluded that there were no low conservation value HUC5s since ESU as a whole has extremely limited distribution of spawning/rearing PCEs; one of only four HUC5s with tributary PCEs in the Coast Range region; HUC5 includes entire spawning range of a TRT historical population	High
	Multiple	Lower Columbia Corridor (Sandy/Washougal to Ocean)	NA						NS	Area not scored since many reaches are outside HUC5 boundaries. However, the CHART concluded that rearing and migration PCEs throughout this corridor are highly essential to ESU conservation	High

* Rated by CHART although HUC5 is currently unoccupied

Figure F1. CHART Ratings of Conservation Value for Habitat Areas in HUC5 Watersheds Occupied by the Columbia River Chum Salmon ESU

Columbia River Chum
CHART Watershed Ratings

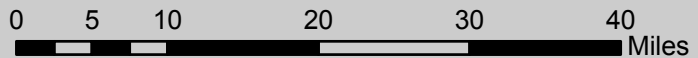


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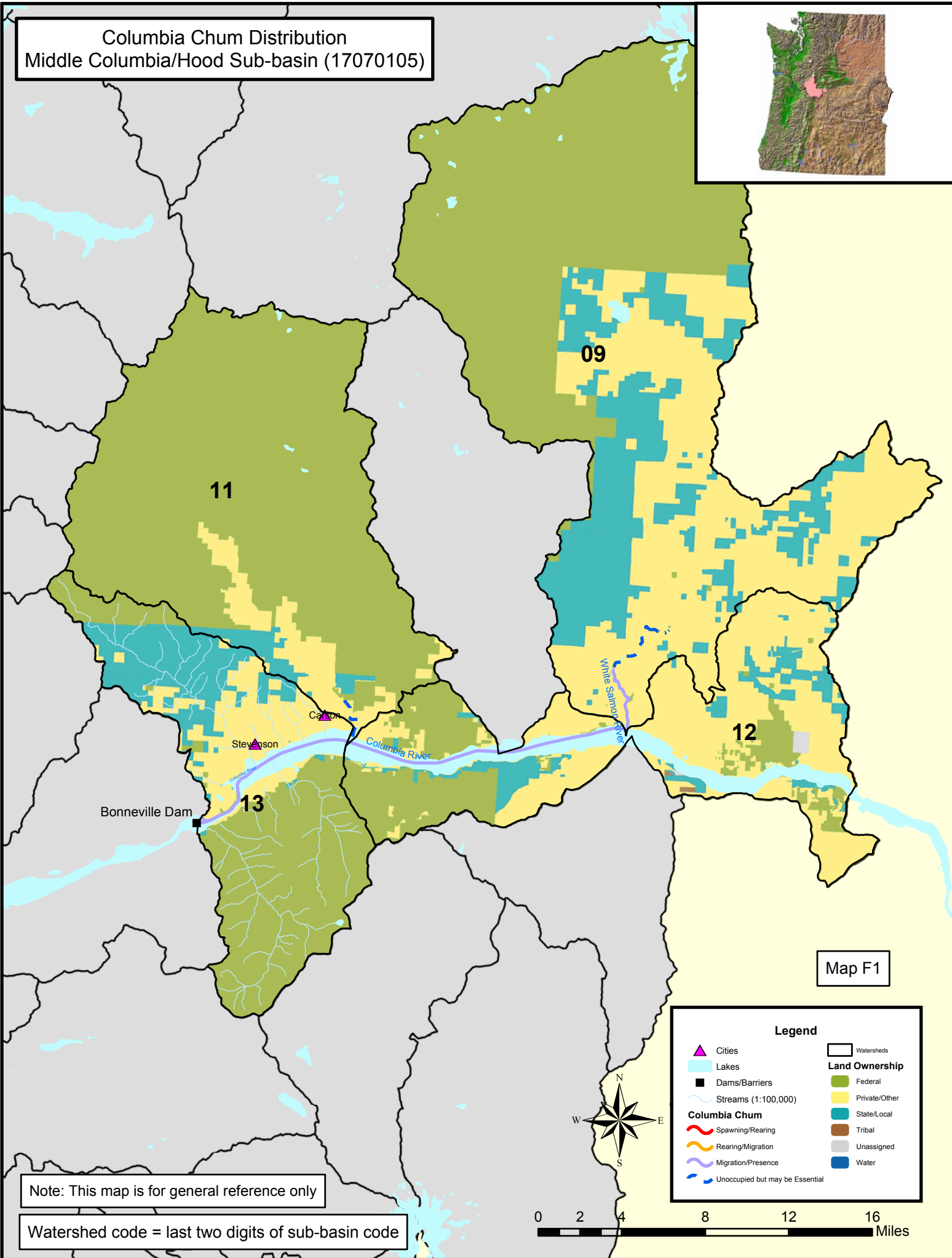
Watersheds (HUC5)

CHART Ratings

- High
- Medium



Columbia Chum Distribution
Middle Columbia/Hood Sub-basin (17070105)



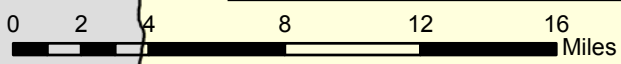
Map F1

Legend

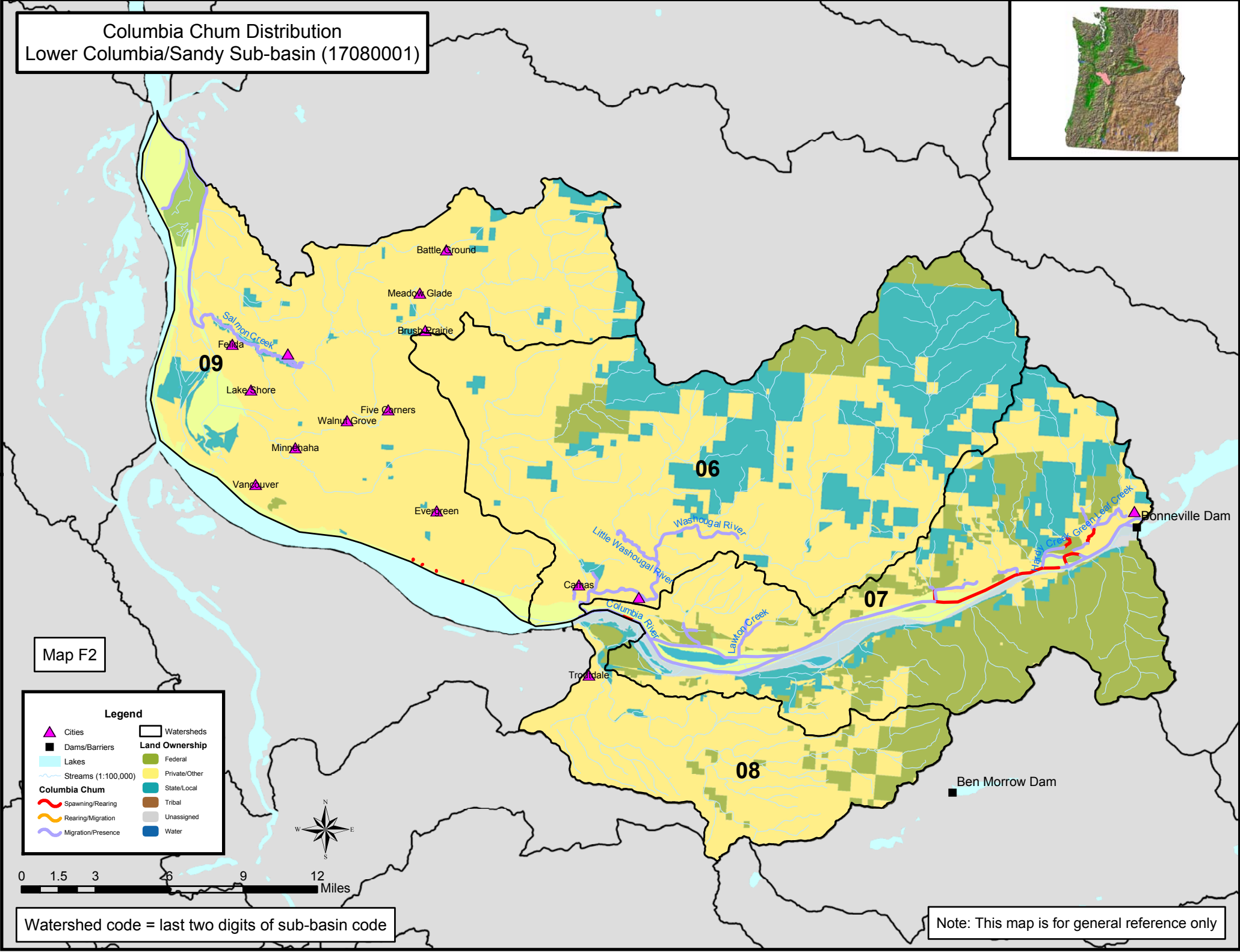
Cities	Watersheds
Lakes	Land Ownership
Dams/Barriers	Federal
Streams (1:100,000)	Private/Other
Columbia Chum	State/Local
Spawning/Rearing	Tribal
Rearing/Migration	Unassigned
Migration/Presence	Water
Unoccupied but may be Essential	

Note: This map is for general reference only

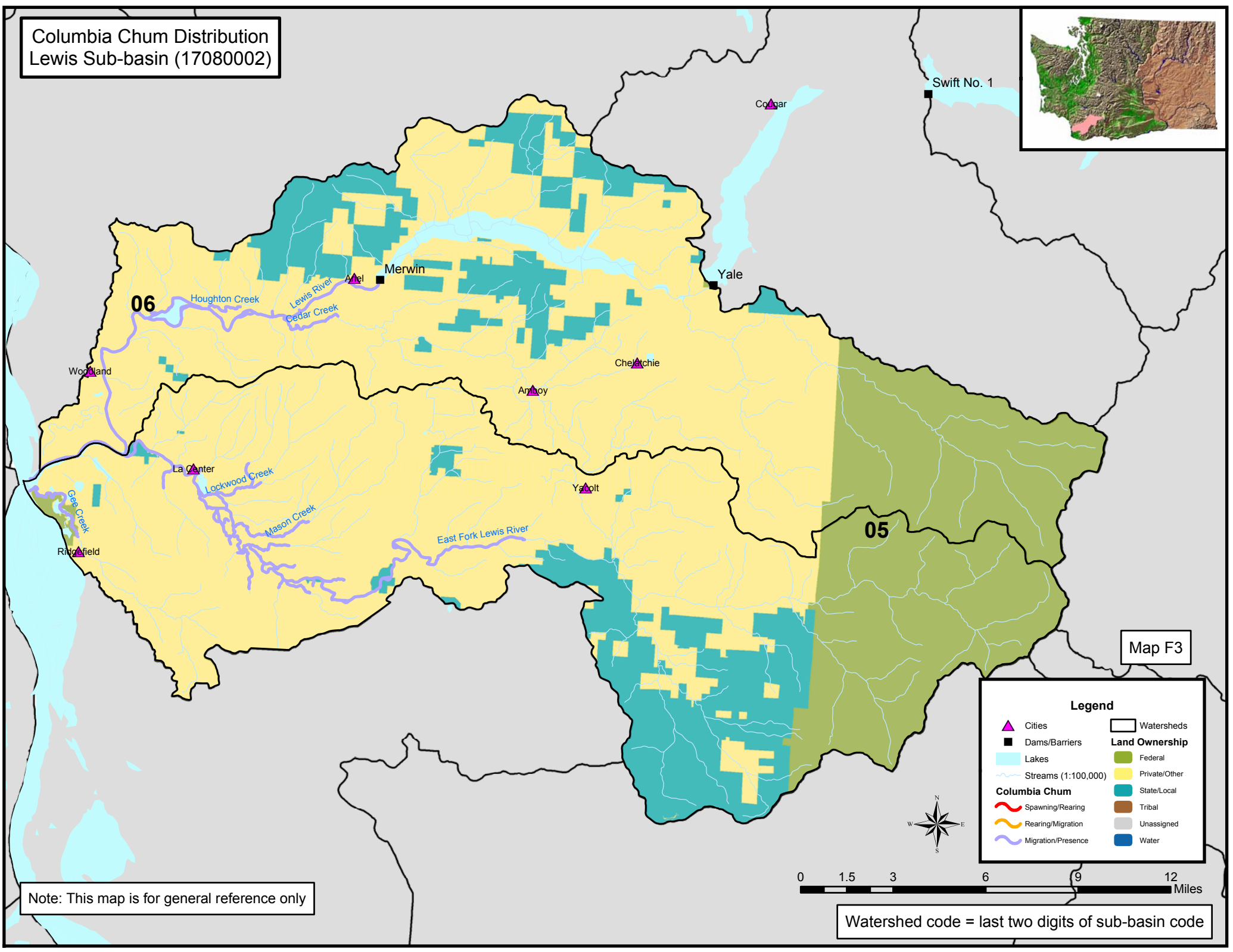
Watershed code = last two digits of sub-basin code



Columbia Chum Distribution
Lower Columbia/Sandy Sub-basin (17080001)



Columbia Chum Distribution
Lewis Sub-basin (17080002)



Map F3

Legend

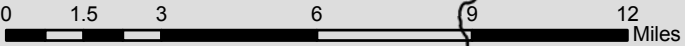
- Cities
- Dams/Barriers
- Lakes
- Streams (1:100,000)
- Columbia Chum**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

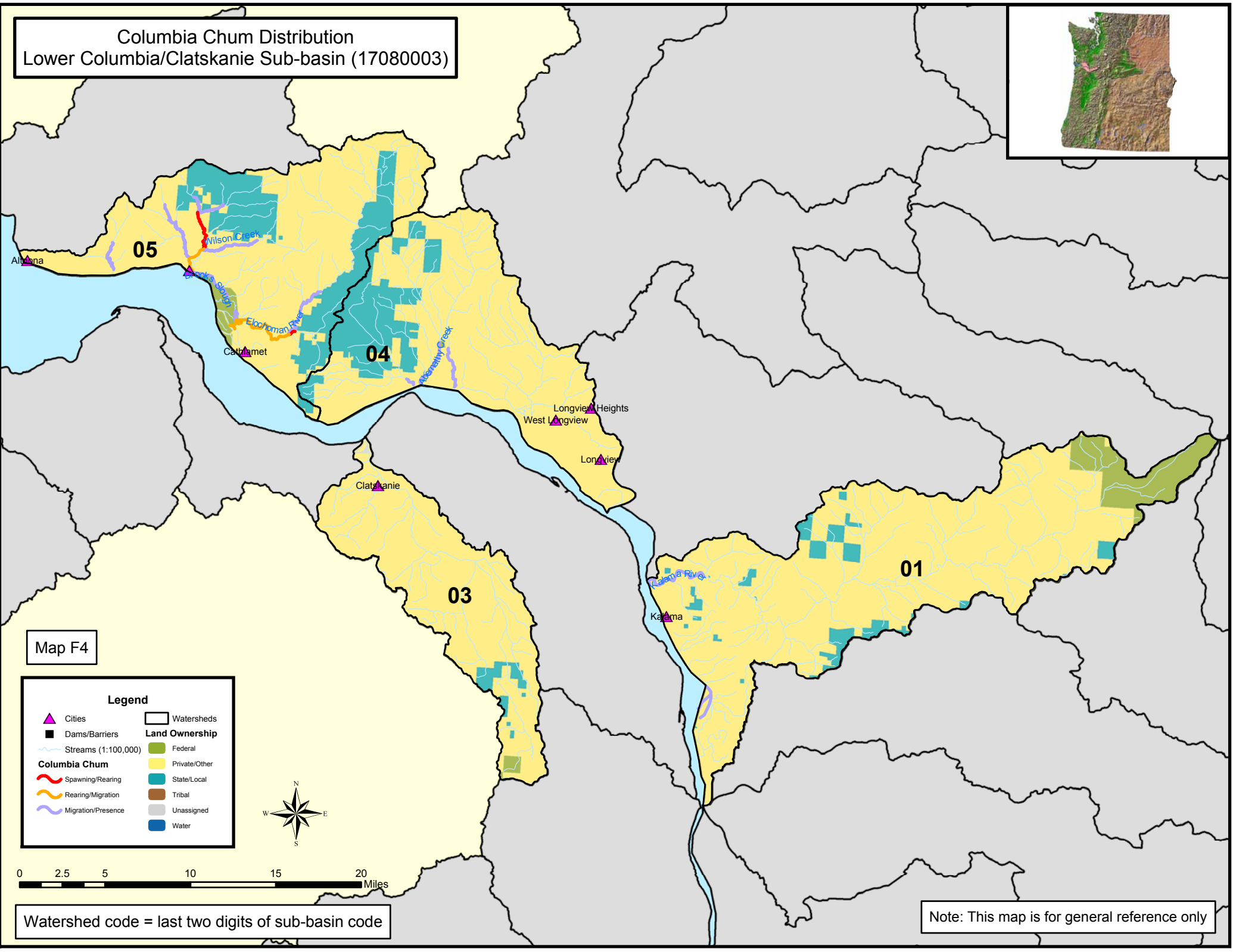
Watersheds

Note: This map is for general reference only



Watershed code = last two digits of sub-basin code

Columbia Chum Distribution Lower Columbia/Clatskanie Sub-basin (17080003)



Map F4

Legend

- Cities
- Dams/Barriers
- Streams (1:100,000)
- Columbia Chum**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds

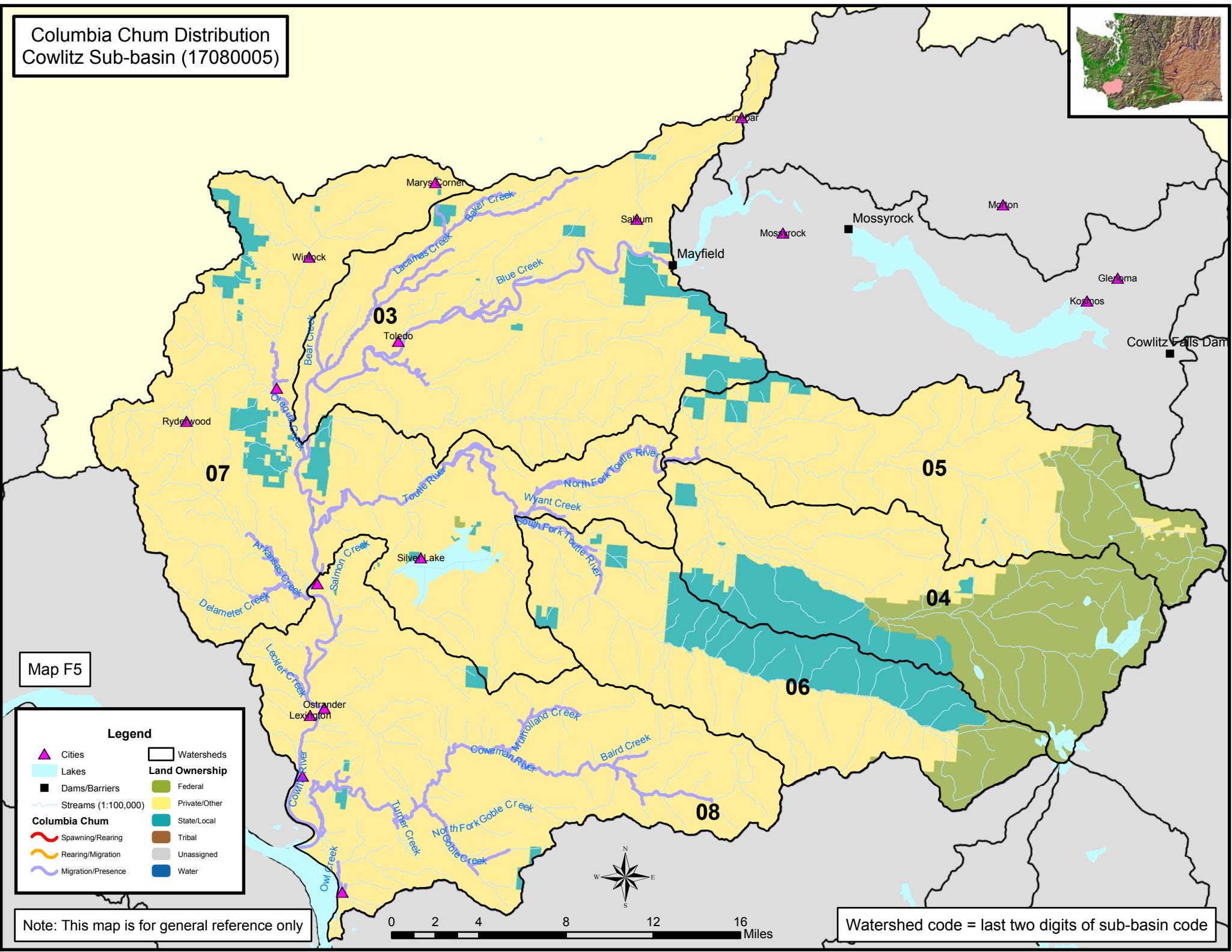


0 2.5 5 10 15 20 Miles

Watershed code = last two digits of sub-basin code

Note: This map is for general reference only

Columbia Chum Distribution
Cowlitz Sub-basin (17080005)



Columbia Chum Distribution Lower Columbia Sub-basin (17080006)



Map F6

Legend

- Cities
- Streams (1:100,000)
- Columbia Chum**
 - Spawning/Rearing
 - Rearing/Migration
 - Migration/Presence

Land Ownership

- Federal
- Private/Other
- State/Local
- Tribal
- Unassigned
- Water

Watersheds



Watershed code = last two digits of sub-basin code

Note: This map is for general reference only